

## REMARKS

This is intended as a full and complete response to the Office Action dated August 28, 2003, having a shortened statutory period for response set to expire on November 28, 2003. Please reconsider the claims pending in the application for reasons discussed below.

In the specification, paragraphs 28, 48, 50 and 51 have been amended to correct minor editorial problems.

Claims 1 - 8 remain pending in the application and are shown above. Claims 1 - 8 stand rejected by the Examiner. Reconsideration of the rejected claims are requested for reasons presented below.

Claims 1, 4, 7 and 8 have been amended to clarify the invention. The amendment is not presented to distinguish a reference, thus, the claims as amended are entitled to a full range of equivalents.

### **35 U.S.C. § 102(b) Rejection(s)**

Claims 1-3, 5-6, and 8 stand rejected under 35 USC § 102(b) as being anticipated by U.S. Patent Application Publication No. 20030029731 (*Ashjaee et al.*). Applicant respectfully traverses the rejection on the grounds that *Ashjaee* does not teach, show, or suggest the use of a first and second electrode to deposit and remove the metal from the surface of the substrate. (See, pages 11 and 12, ¶¶ [0047], [0050] and [0051]). *Ashjaee* only describes the use of a single electrode (*i.e.*, anode plate 9; See Fig. 3, page 2, ¶[0035]; Fig. 4, page 3, ¶[0037]) to perform the deposition and removal processes and thus cannot independently bias the substrate. Therefore, *Ashjaee* does not teach, show, or suggest the use of a deposition and polishing process, as recited in claim 1, and claims depending thereon. Withdrawal of the rejection is respectfully requested.

### **35 U.S.C. § 103(a) Rejection(s)**

Claims 4 and 7 stand rejected under 35 USC § 103(a) as being obvious in view of *Ashjaee*. *Ashjaee* discloses an electrochemical cell having a single electrode (*i.e.*,

anode plate 9) that is used to deposit and remove material from the surface of the substrate. (See, *Ashjaee* Fig. 3, page 2 ¶[0035]; Fig. 4, page 3 ¶[0037]) As noted above, the applicant has amended independent claim 1 and dependent claims 4 and 7 to more clearly recite the aspects of the invention. *Ashjaee* does not teach, show or suggest two separate electrodes that can be biased independently of each other to complete the deposition and/or material removal processes. Therefore, *Ashjaee* does not teach, show, or suggest the use of a deposition and polishing process, as recited in claim 1 and dependent claims 2 - 8. Therefore, withdrawal of the rejection is respectfully requested.

### **New Claims**

New claims 9 – 25 have been added. The applicant believes that claims 9 – 25 are fully supported by the specification and do not introduce new matter. Thus, the applicant respectfully requests allowance of these claims.

Claim 9 recites a method of applying “the first electrical potential applied relative to the first electrode is within a range of about 0 volts to about +5 volts and the second electrical potential applied relative to the second electrode is within a range of about 0 volts to about -5 volts are alternately applied,” which is not shown by the art of record.

Claim 10 recites “varying the magnitude of the second electrical bias relative to the first electrical bias as the metal layer is formed,” which is not shown by the art of record.

Claim 11 recites a method of planarizing a substrate by providing the substrate to a electromechanical plating and polishing cell and a chemical mechanical polishing cell, which is not shown by the art of record.

Claim 12 recites a method of planarizing the a substrate by providing the substrate to a first electromechanical plating and polishing cell, a second electromechanical plating and polishing cell, and a chemical mechanical polishing cell, which is not shown by the art of record.

Claim 13 recites an apparatus for depositing and planarizing a metal layer on the surface of substrate that comprises a porous polishing pad, a carrier head, an electrode,

a diffuser plate, a membrane and a power source, which is not shown by the art of record.

Claim 14 recites the apparatus of 13 further comprising a second electrode and a second power source, which is not shown by the art of record.

Claim 15 recites the apparatus of 13 where “the substrate receiving surface of the porous polishing pad contains an abrasive component to mechanically abrade a surface of the substrate,” which is not shown by the art of record.

Claim 16 recites the apparatus of 13 where “the membrane prevents the passage of particles from one side of the membrane to the other,” which is not shown by the art of record.

Claim 17 recites the apparatus of 13 further comprising an endpoint detector mounted adjacent to the substrate receiving surface, which is not shown by the art of record.

Claim 18 recites an apparatus for depositing and planarizing a metal layer on the surface of substrate that comprises a wet electromechanical plating and polishing chamber, a porous polishing pad, a carrier head, an electrode, a second electrode, a diffuser plate, a first power source, and a second power source, which is not shown by the art of record.

Claim 19 recites the apparatus of 18 where “further comprising a membrane that is positioned between the diffuser plate and the electrode,” which is not shown by the art of record.

Claim 20 recites the apparatus of 19 wherein “the membrane prevents the passage of particles from one side of the membrane to the other,” which is not shown by the art of record.

Claim 21 recites the apparatus of 18 wherein “the substrate receiving surface of the porous polishing pad contains an abrasive component to mechanically abrade a surface of the substrate,” which is not shown by the art of record.

Claim 22 recites the apparatus of 18 further comprising “an endpoint detector mounted adjacent to the substrate receiving surface,” which is not shown by the art of record.

Claim 23 recites a system for depositing and planarizing a metal layer on the surface of a substrate, comprising: a wet electromechanical plating and polishing chamber comprising: a porous polishing pad, a carrier head, an electrode, and a power source; a chemical mechanical polishing chamber comprising: a polishing pad, a carrier head; and a transfer mechanism to pickup and place the substrate in the wet electromechanical plating and polishing chamber and the chemical mechanical polishing chamber, which is not shown by the art of record.

Claim 24 recites a method of forming a metal layer on a substrate by positioning a substrate to an electroplating and polishing cell, contacting at least a portion of the substrate to the porous pad, forming a metal layer on the substrate by biasing the substrate relative to an electrode at a first electrical bias and then biasing the substrate relative to the electrode at a second electrical bias, wherein the first electrical bias deposits metal on the substrate and the second electrical bias removes metal from the substrate, and varying the magnitude of the second electrical bias relative to the first electrical bias as the metal layer is formed, which is not shown by the art of record.

Claim 25 recites a method of forming a metal layer on a substrate by positioning a substrate to an electroplating and polishing cell, contacting at least a portion of the substrate to the porous pad, forming a metal layer on the substrate by biasing the substrate relative to an electrode at a first electrical bias and concurrently biasing the substrate relative to the electrode at a second electrical bias, and wherein the first electrical bias deposits metal on the substrate and the second electrical bias removes metal from the substrate.


#### Conclusion

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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